



August 12, 2010

Philip Guidice, Commissioner
Department of Energy Resources
100 Cambridge Street, 10th Floor
Boston, MA 02114
Via email: doer.biomass@state.ma.us

Re: **Carbon Accounting and Biomass/RPS Policy Directions**

Dear Commissioner Guidice:

On behalf of the Sierra Club we submit the following comments to the Department of Energy Resources (DOER) on the *Biomass Sustainability and Carbon Policy Study* (Manomet Study) and the subsequently held public meetings. We commend DOER for addressing this extremely critical environmental issue and applaud the administration for offering a progressive policy directive to DOER to modify the treatment of biomass fuels under the Massachusetts *Renewable Energy Portfolio Standard* (RPS). We stand on the precipice of a nationwide biomass policy-disaster, but we have an opportunity to make a last-minute – but critical – correction for our renewable energy future. The actions taken in Massachusetts will establish a precedent for other states and our entire nation to follow.

The Massachusetts Sierra Club's concerns related to classifying woody biomass as “renewable” and its continuing eligibility for REC's under the Massachusetts RPS include:

- CO2 emitted from any source should always be counted in any regulatory framework and the impacts reviewed and considered under any greenhouse gas reduction strategies.
- CO2 from any classified renewable source should always consider the time-frame and rates which CO2 can be recaptured, and if the recapture rates increase or decrease our ability to meet desired outcomes or statutorily mandated CO2 reduction targets.
- Any source classified as renewable or green should meet certain efficiency standards and, at a minimum, meet or exceed the efficiency and CO2 emission standards of the best available and most efficient fossil-fuel source.
- We must take every action possible to reduce CO2 emissions *now*, rather than later, to avoid reaching a tipping point in the climate change crisis.
- Renewable or green energy sources should operate in a sustainable fashion, including avoiding, minimizing, or properly mitigating any impacts on the natural environment.

For utility-scale biomass the primary impacts come from land-use changes from the significant volumes of wood required to fuel the facilities, CO2 and other toxic air emissions while the plant is operational, and water quality impacts. Based in part on information as presented in the Manomet Study, utility-scale biomass is unable to meet, to our satisfaction, a single requirement outlined above. We therefore oppose utility-scale biomass which combusts wood as primary fuel source, and we support the policy directions outlined in the July 7, 2010 Executive Office of Energy and Environmental Affairs directive to DOER instructing the department to promulgate regulations by December 31, 2010.

FURTHER COMMENTS ON THE MANOMET STUDY AND BIOMASS

The environmental community, the administration, and the legislature missed key opportunities early on to question some basic concepts of biomass energy generation, including the inefficiency of utility-scale wood-burning biomass energy production, operational CO₂ emissions, and the associated impacts on forest ecosystems, air and water quality, and public health. Unfortunately, the Massachusetts Environmental Policy Act (MEPA) has also failed to provide the necessary thresholds to avoid, minimize, or mitigate the impacts for proposed biomass facilities.

Biomass concerns arose as an unanticipated consequence of well-meaning action's otherwise intended to promote renewable energy and curb global warming, including the *Green Communities Act*, the *Biofuels Act*, and modifications to the RPS. Unfortunately, many of the assumptions on which these earlier policy decisions were based have turned out to be scientifically flawed. A critical – but fixable – error in legal accounting rules used to measure compliance with carbon limits for bio-energy could undermine efforts to reduce greenhouse gas emissions and encourage deforestation here in Massachusetts and nationwide¹.

Manomet Biomass Study and DOER Suspension of REC's

In response to concerns raised by the environmental and scientific community, DOER issued (December 2009) a suspension of review of RPS Statement of Qualification Applications for biomass generation units using clean wood as fuel. Subsequently, the Manomet Study has concluded there is no reasonable combination of harvesting and biomass firing technology that will produce forest biomass with net emissions less than those from coal over a 40 year period. This is perhaps the single most significant finding in the study, and has understandably caused a significant stir in the scientific, academic, environmental, and biomass industry sectors. The finding is based on well-researched and documented information, and provides a credible basis to revisit any incentive structure to promote biomass as a “green” or “renewable” technology.

Industry Reaction and Panel Response to the Manomet Study

The findings of the study have caused the biomass industry to call for everything from “retractions” to “apologies” from the authors. Some of the panel members have even appeared in the media, apparently retreating on some information contained in the study. These actions only undermine the credibility of the work, while doing nothing to change or modify the scientific findings contained therein. This is not befitting of a scientific panel and only encourages the biomass industry (those most financially affected by its findings) to further challenge the results. We respectfully suggest that key members of the advisory team should spend valuable time explaining to the public what the study *does* mean, not apologizing for it and explaining what it *doesn't* mean.

The Sierra Club would welcome peer review of the science presented by Manomet, as we are confident that the findings are not only accurate, but in fact underestimate the impacts of the biomass industry on the natural environment². In many ways the Manomet Study *is* the peer review for decades of flawed science that have preceded it. There should be no delay in moving forward with policy directives or regulatory modifications supported by the Manomet Study.

CO₂ Emissions from Biomass

Under the current regulatory framework, governments and the energy sector are playing a clever game where CO₂ emissions would not be counted by regulatory entities, even as they are being pumped into the natural environment at ever increasing rates. The operational CO₂

¹ Searchinger, Timothy D. et. al., Fixing a Critical Climate Accounting Error, *Science* 326, 527-528 (2009).

² <http://www.mass.gov/Eoeea/docs/doer/renewables/biomass/study-comments/booth.pdf>

emissions from biomass will exceed that of even coal per unit of energy generated, as described in the study, at a time when leading climate scientists are calling for immediate carbon dioxide reductions of 2 to 3 percent per year to avert the worst impacts of global climate change. The Commonwealth's statutory mandate under the *Global Warming Solutions Act* are consistent with these reduction levels. This goal will be impossible to reach if CO₂ emissions increase dramatically from any source, such as ramping up the utility-scale biomass sector.

Quite simply, harvesting existing forests for electricity adds net carbon to the atmosphere³, and great quantities of CO₂ would be released *now*. A net CO₂ increase at this time from biomass burning may accelerate climate change and make it difficult or impossible to meet CO₂ reduction targets of 80% by 2050. Biomass proponents take issue when opponents cite the massive harvesting and carbon pulse created by the operations of a facility, but the industry is not proposing to "turn facilities off" to allow the trees that will theoretically re-grow to "catch up" and reabsorb the carbon released when they are combusted for energy. As long as a utility-scale biomass sector is operational, carbon emissions will be increasing over time.

Biomass – Sustainable, Carbon Neutral?

Biomass is considered by many to be a renewable source of energy that does not aggravate global warming because the carbon involved is functioning in a shorter cycle than fossil fuels, and regrowth can theoretically balance the emissions. However, unsustainable land use practices may release soil carbon to the atmosphere. Accelerated and poorly-managed harvesting of forests and crops as fuel accompanied by the conversion of natural ecosystems to fuel farms will increase global warming and degrade the environment. Harvesting, transportation and processing of fuel stocks is highly energy intensive. These are but a few of the many "externalities" of biomass that are typically not considered in "carbon neutral" assertions of biomass enthusiasts. It is important to make a distinction between what becomes classified as "renewable" or "green" and what is actually "sustainable" from an environmental perspective.

The Sierra Club believes that biomass projects can be *theoretically* sustainable, but that most biomass projects are *not*. Native forests are presently the largest proposed source of fuel for projects defined as biomass. There is little likelihood that energy resources provided by forest biomass can be increased sustainably. We are not confident that massive new biomass energy resources are available without risking soil and forest health, given the lack of commitment by governments and industry to the preservation, restoration, and conservation of natural resources, and the extended timescale necessary to mitigate impacts. Even with such commitments, we believe state and federal governments should instead allocate scarce resources to promote truly renewable and environmentally beneficial solutions, not questionable power generation that involves burning trees or construction and demolition debris.

We are concerned that the levels and scale of wood harvesting required for even a single utility-scale biomass energy facility could dramatically alter the landscape of the commonwealth. A typical plant requires 13,000 tons of green biomass to generate one megawatt of biomass power for one year, or 35 tons of green wood per megawatt per day.⁴ In addition, regardless of the scale of a facility, it is the scale of harvesting that is most relevant. The impacts of multiple small-scale facilities could easily exceed that of larger facilities. Neither scenario is a desirable outcome.

Waste Wood / Residues

A further claim of the biomass industry in the wake of the Manomet Study has been that the findings do not represent the operational procedures of the industry, and that facilities do not intend to use fuel stocks such as whole trees. The industry's own data clearly contradicts these claims.

³ibid

⁴ Innovative Natural Resource Solutions, 2007. Biomass Availability Analysis Report, Massachusetts Division of Energy Resources.
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Most facilities use whole trees, and the practice will increase if more facilities are built. An analysis tool provided by the *National Renewable Energy Laboratory* indicates residues in Massachusetts would supply a mere 6.35 MW of biomass power fueled by the amount of wood that could be generated in the five counties of western Massachusetts.⁵ There is already more than 100 MW of biomass proposed in the commonwealth.

Supplies will inevitably fall short of expectations, and the remaining fuel stock would therefore likely come from whole-tree harvesting or other sources with significant environmental impacts. It should be further noted that “waste wood” is theoretically wood that will *not* re-grow (since it is “waste”) and yet biomass enthusiasts have no issue with including waste wood volume in their carbon-neutrality calculations (“double-counting”). Many foresters and scientists agree that biomass fuel consumption reduces the ability of remaining and regenerating forest eco-systems to sequester carbon and destroys important natural habitats by reducing the amount of nutrients and woody debris available for recycling in the forest. These residues are better left in place, rather than being burnt for power generation. Furthermore, the theory that new forests absorb carbon faster than older forests has been challenged by multiple studies, including studies in New England.⁶

Wood resources in Massachusetts should be reserved for the highest and best use possible, for example for creation of durable wood products, not energy production. To the extent that residues may be generated by other industries, we must understand the full impacts of removal of residues from the forest ecosystem, and we support the creation of definitions in regulation to ensure that residues are truly incidental to other operations, and are not in fact used to drive an increase in harvesting.

Mitigation and Sustainable Harvesting:

New York is proposing that biomass fuel can not be defined as sustainable — including mill waste and construction and demolition debris— unless it originated in forests that are under a permanent easement or other legal arrangement guaranteeing that the land will remain protected as forests for at least 100 years. As the Manomet study has concluded, there is no reasonable combination of harvesting and biomass firing technology that will produce forest biomass with net emissions less than those from coal over a 40 year period. The Sierra Club is not confident that significant potential for biomass power generation is possible without compromising soil and forest health, nor are we confident that regulatory frameworks exist or can be developed to prevent the unsustainable exploitation of forest eco-systems for utility-scale biomass power generation.

Supplies will run short (based on the industry's own data) and the pressure to harvest will increase. Therefore, within the given time-frame, CO₂ emissions will also increase and undermine climate change mitigation efforts. The state must move forward with adopting sustainability and harvesting standards, similar to those suggested in the EOEEA policy directive, for any biomass feedstocks.

Construction and Demolition Waste (C&D)

In addition to trees and other forest residues, construction and demolition waste is proposed as fuel for biomass facilities, either to be used exclusively or in combination with forest biomass. Projects based on construction and demolition waste are often treated similarly to biomass in existing regulatory frameworks (CO₂ emissions not counted) and efforts continue to relax standards for burning such debris. Construction and demolition debris is neither clean nor beneficial for air quality or CO₂ emissions. Even after material sorting, plants burning C&D emit particulates and large amounts of lead, arsenic, mercury, dioxins, and other hazardous air pollutants. New

⁵ Massachusetts Environmental Energy Alliance, Correspondence to EOEEA Secretary Ian Bowles, November 22, 2009. <http://massenvironmentalenergy.org/docs/MEEA%20to%20Sec%20Bowles%20on%20harvest%20sustainability%20Nov%2022%202009.pdf>

⁶ Keeton, W., Kraft, C., and Warren, D. 2007. Mature and old-growth riparian forests: structure, dynamics, and effects on Adirondack stream habitats. *Ecological Applications*. 17(3):852-868, and Munger, B. and Wofsy, S. Unpubl. data, Harvard Forest

Hampshire has banned the burning of C&D based on the overwhelming public health impacts. When combined with incentives to burn multiple fuel stocks, including forest byproducts or municipal tree trimmings, you can quickly create strong incentives for plant managers to use unsustainable or contaminated fuel if the intended supply runs short. The Sierra Club supports the directive to DOER to exclude C&D as eligible for REC's.

Competition for Other Renewables

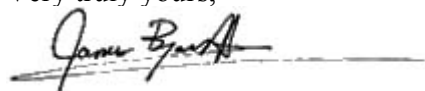
The Sierra Club believes that discontinuing eligibility of biomass under the renewable portfolio standard will greatly enhance and promote the viability of other more "green" renewable technologies. Ultimately, REC eligibility should be phased out for all utility-scale biomass facilities, including existing operations. As long as woody fuel is viewed as "inexhaustible" or at least readily available in high volumes and at relatively cheap rates, biomass will out-compete other renewables in the market place. If we ramp up the biomass sector - as proposed under current state and federal regulatory schemes - more than 50 % of our nation's renewable energy will come from biomass burning by 2030⁷, and most of it from burning trees. Other alternatives with significantly lower carbon emissions than biomass will simply lose out.

Conclusion / Recommendations

The Sierra Club believes our nation's path to a truly renewable energy future should not be paved with outdated technologies and bad ideas. There are cleaner, better, and faster solutions to meet our energy needs, including wind, solar, and tidal energy, and the tremendous strides to be made in the efficiency sector. The Sierra Club opposes the permitting and construction of utility-scale biomass power generation in the commonwealth, including facilities that would burn either forest biomass or construction and demolition waste, and we support the stated intent to exclude the eligibility of utility-scale biomass for REC's. We do not at present believe these exclusions should apply to other biomass fuels, including agricultural waste as fuel, anaerobic digestion, algae crops, or short-rotational farm crops which may include switch grass, herbaceous crops, and woody crops such as willow.

It is now clear that the latest and best science supports other paths to reduce greenhouse gas emissions. Therefore, it is in the best interest of both the environmental *and* business community to act quickly and we believe the recent policy directive from EOEEA is a major step in the right direction. The rush to build utility-scale projects throughout New England is largely a result of regulatory incentives and loopholes combined with "green energy" subsidies of various types available to energy speculators. Should these facilities proceed under the current paradigm, significant tax and ratepayer dollars will go to large-scale devastation of forest ecosystems, as well as accelerating the impacts of global climate change. We believe public *and* investor dollars are better spent on other truly renewable and sustainable energy solutions.

Very truly yours,



James Bryan McCaffrey
Director, Massachusetts Sierra Club

Attachments: *Massachusetts Sierra Club Position Statement Forest and Woody Biomass Fuels, January 2010*

⁷ EWG report at <http://www.ewg.org/clearcut-disaster>.

Sierra Club Statement On Forest and Woody Biomass Fuels, January 2010

Background

The Sierra Club opposes the unsustainable exploitation of forest ecosystems. The Sierra Club has significant concerns over the production of energy from forest or woody biomass, including the inefficiency of utility-scale wood-burning biomass energy production, the resultant operational CO₂ emissions, and the associated impacts on forest ecosystems, air and water quality, and public health. Claims of “carbon neutrality” by biomass and industry proponents rely on outdated information and questionable assumptions.⁸ The Sierra Club is not confident that significant potential for biomass power generation is possible without compromising soil and forest health, nor are we confident that regulatory frameworks exist or can be developed to prevent the unsustainable exploitation of forest eco-systems for utility-scale biomass power generation. Regardless of the scale of a facility, it is the scale of harvesting that is most relevant. The impacts of multiple small-scale facilities could easily exceed that of larger facilities. Neither scenario is a desirable outcome.

Whereas:

- Native forests are presently the largest source of fuel for projects defined as biomass.
- Harvesting existing forests for electricity adds net carbon to the atmosphere.⁹
- There is little likelihood that energy resources provided by forest biomass can be increased sustainably.
- Leading climate change scientists call for immediate carbon dioxide reductions of 2 to 3 percent per year to avert the worst impacts of global climate change.
- A net carbon dioxide increase at this time from biomass harvesting and burning may accelerate climate change impacts and make it difficult or impossible to meet CO₂ reduction targets of 80% by 2050.
- *A typical Utility-Scale electricity-only power-plant using forest or woody biomass as fuel:*
 - Generates electricity at less than 25% efficiency, or less than a typical coal-fired power plant.
 - Emits 1.5 times as much operational CO₂ than coal per unit of energy generated.
 - Emits 3 to 4 times as much operational CO₂ than natural gas per unit of energy generated.
 - Has the potential for profound impacts on local and regional air and water quality.
 - Burns over one ton of wood per minute, requiring 13,000 tons of green biomass to generate one megawatt of biomass power for one year, or 35 tons of green wood per megawatt per day.¹⁰
 - With unsustainable biomass harvesting and consumption, can reduce the ability of remaining and regenerating forest eco-systems to sequester carbon and destroy important natural habitats by reducing the amount of nutrients and woody debris available for recycling in the forest.

Be it resolved that the Massachusetts Chapter of the Sierra Club hereby:

- Opposes biomass energy generation processes which contribute to the destruction of existing forests.
- Opposes utility-scale electricity-generating biomass facilities whose fuel consists of woody biomass extracted from forest ecosystems.
- Opposes regulatory classification of utility-scale woody biomass as “renewable” or “carbon-neutral”.
- Encourages governmental and regulatory entities to remove eligibility for *Renewable Energy Credits* and all similar incentives or subsidies for utility-scale wood-burning biomass facilities.
- Encourages full environmental review of all proposed biomass facilities regardless of scale.
- Will review on a site-specific basis small-scale combined heat and power biomass-to-energy projects which avoid inefficient transportation of fuel stocks by providing distributed power directly to end users and on lands where they are carefully monitored and designed as part of a sustainable system similar to that required for Forest Stewardship Council certification.

Approved unanimously by the Massachusetts Chapter Executive Committee, December 20, 2009. *The term “biomass” in this statement refers to forest/woody biomass and does not apply to agricultural waste as fuel, algae crops, or farm crops which may include switch grass, woody herbaceous crops, and short rotational woody crops such as willow. The Sierra Club opposes burning of construction and demolition debris as biomass fuel which is further covered in separate Chapter policies. For a complete background on this policy and biomass issues please visit www.sierraclubmass.org/biomass.html.*

⁸ Searchinger, Timothy D. et. al., Fixing a Critical Climate Accounting Error, Science 326, 527-528 (2009).

⁹ *ibid*

¹⁰ Innovative Natural Resource Solutions, 2007. Biomass Availability Analysis Report prepared for the Massachusetts Division of Energy Resources.